

Appendix 4.41  
(Revised)  
October 1967

STANDARD INSPECTION PROCEDURE  
FOR  
FLARE, FUSEE TYPE, SEQUENTIAL BURNING  
RED, GREEN, AND YELLOW  
(1370-HOO-7950)  
(1370-HOO-8786)  
(1370-HOO-8787)

1. Technical:

This item consists of three separate modified, railroad type fusee flares that may be utilized in a one-, two-, or maximum three-unit sectionized assembly for drop zone authentication. The sequential burning time varies from approximately 10 minutes for one section through as much as 20 for two and 30 minutes for all three sections. Each section has an igniter in its base which provides for the chain ignition of the next section if two or three sections are used. The flares are available in unit packs of three sections in the following colors:

RED, GREEN, OR YELLOW

The flare sections may be easily and rapidly assembled end-to-end by pulling the cloth tab of the first section upwards to remove the protective cap and inserting this exposed top into the adjustable plastic sleeve at the base of another section. The resultant assembly, in turn, is inserted into a special base mount provided for this purpose. The base mount must be placed in the ground at a slight angle to assure complete burning and to prevent a chimneying effect.

The complete unit, including flares, sleeves, and base mount, is first sealed with foil vaporproof barrier and then placed in a cylindrical fiber container having metal ends.

Flare components are:

- 3 Sections (each  $8\frac{1}{2}$  inches long with 10-minute burning time)
- 2 Plastic Sleeves
- 1 Plastic Mounting Base

2. Samples Required:

The number of samples required to represent a lot is as follows:

- For classification test ----- 15 (45 Sections)
- For confirmation test ----- As directed

3. Selection of Samples:

The samples will be randomly selected in accordance with normal sampling practices except that 5 each may be taken from each of 3 wooden boxes.

4. Preparation of Samples:

a. Samples sections will be numbered 1 through 1 through 45 and such numbers will be maintained throughout the actual testing.

b. Samples will receive the preparation required for each of the following phases:

(1) Phase I - Burning time, burning quality and ignition transfer. Sample sections 1 through 21 will be tested in this phase with no preparation.

(2) Phase II - Spontaneous ignition test. Sample sections 22 through 33 will be exposed continuously to a temperature of 70°C plus or minus 5°C (158°F plus or minus 9°F) for 72 hours and then tested as soon as possible thereafter.

(3) Phase III-Submersion test. Sample sections 34 through 45 will be tested in this phase with no preparation.

5. Visual Inspection:

All samples will be given a careful visual inspection covering the following points:

a. Suitability of inner and outer packing in regard to withstanding additional handling and storage.

b. Sterility.

c. Missing or damaged components which would preclude use of the item for its intended purpose.

6. Procedure for Function Test:

a. Phase I - Each sample will be assembled into 3 section flares and ignited by removing the paper covering over the cap with the aid of the tear strip, and striking the match head with the striking composition on the outer surface of the cap. The flare will then be placed in an inclined position in the ground or in a holder and allowed to burn out.

b. Phase II

(1) Each sample section will be removed from the temperature conditioning oven and observed to determine if spontaneous ignition has occurred due to the elevated temperature.

(2) Each sample section which did not ignite spontaneously will be ignited separately and placed in an inclined position in the ground or in a holder and allowed to burn out.

c. Phase III - Each sample section will be ignited separately and after burning in air for approximately 5 seconds or until definite flare color is established, will be submerged in water in a vertical position with head down. After 2 minutes the samples will be removed from the water, placed as in b above and allowed to burn out if still burning.

7. Observations:

a. Phase I

- (1) Fails to ignite.
- (2) Color and intensity of illuminant.
- (3) Burning time in minutes and seconds.
- (4) Ignition transfer from 1 section to another.

b. Phase II

- (1) Fails to ignite.
- (2) Evidence of spontaneous ignition
- (3) Color and intensity.
- (4) Burning time.

c. Phase III

- (1) Fails to ignite.
- (2) Color and intensity
- (3) Fails to burn two minutes under water.
- (4) Fails to continue burning to complete consumption.

8. Classification of Defects:

Defects observed during visual inspection and function test will be classified in accordance with paragraphs 9 and 10. Any defects found which are not listed will be reported in detail along with the senior ordnance officer's recommendations as to classification.

9. Non-functional Defects:

a. Critical:

- (1) Item not sterile.

b. Major: None

c. Minor:

- (1) Missing bonnet on cap.
- (2) Excessively loose or missing spike.
- (3) Torn or missing tear strip.
- (4) Body tube damaged.
- (5) Instruction sheet missing.

10. Functional Defects:

a. Critical:

- (1) Spontaneous ignition of any flare section.
- (2) Improper flare color. (Different from physical color)

b. Major:

- (1) Failure to ignite.
- (2) Fails to transfer ignition from one section to another, Phase I.
- (3) Chimney in such a manner as to materially observe the flare.
- (4) Burning time of 7 minutes or less for each section, Phase I & II.
- (5) Burning time of 15 minutes or more for each section, Phase I & II.
- (6) Fails to burn 2 minutes under water, Phase III.

c. Minor:

- (1) Burning time between 7 and 8 minutes per section, Phase I & II.
- (2) Burning time between 13 and 15 minutes per section, Phase I & II.

(NOTE: Acceptable burning time is between 8 and 13 minutes.)

11. Grading:

a. Non-functional grades will be established in accordance with the following:

(1) Grade J - A lot will be classified Grade J if critical defect is observed.

(2) Subgrade A - A lot having not more than 3 major defectives and not more than 5 minor defectives in the 45 sample sections inspected will be classified Subgrade A.

(3) Subgrade B - A lot not meeting the requirements for Subgrade A but having not more than 6 major defectives and not more than 11 minor defectives in 45 samples will be classified Subgrade B.

(4) Subgrade D - A lot not meeting the requirements for Subgrades A or B will be classified Subgrade D.

b. Functional grades will be established in accordance with the following:

(1) Grade J - A lot will be classified Grade J if one critical defect is observed.

(2) Subgrade A - A lot having not more than one major defective and not more than one minor defective in each of the three phases will be classified Subgrade A.

(3) Subgrade B - A lot not meeting the requirements for Subgrade A and not having more than 2 major defectives and not more than 4 minor defectives in each of the three phases will be Subgrade B.

(4) Subgrade D - A lot not meeting the requirements for Subgrades A or B will be Subgrade D.

11. Classification for Shipping and Storage:

Shipping Nomenclature ----- Fusee, Railway

ICC Nomenclature ----- Railway Fusees - Handle  
Carefully - Keep Fire Away

ICC Class ----- C

Ordnance Explosive Class ----- 2

Coast Guard Class ----- II-C

Storage Compatibility Group ----- N

## INSTRUCTIONS FOR SEQUENTIAL BURNING FUSEE

1. Remove the fusee sections from the protective skim bag.
2. Pull the cloth tab and remove the protective caps from the ends of the fusee sections.
3. Assemble the fusee sections for the desired amount of time (1 section—10 minutes, 2 sections—20 minutes, 3 sections—30 minutes), using the adjustable plastic sleeve. (See figure 1.)
4. Place the spiked sleeve on the base end of the assembled fusee sections. (See figure 2.)
5. Stick the assembled unit into the ground at a slight angle (20°) to assure complete burning. (See figure 2.)
6. Ignite by scratching the top fusee against the striker board of the protective cap.

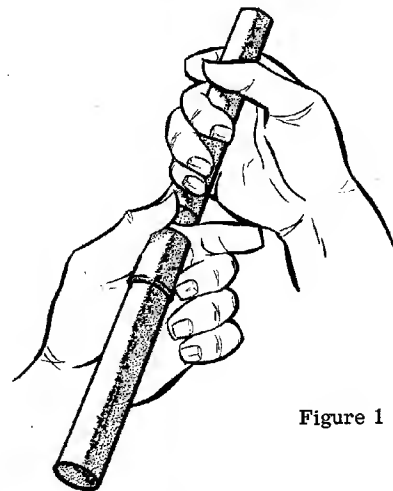


Figure 1

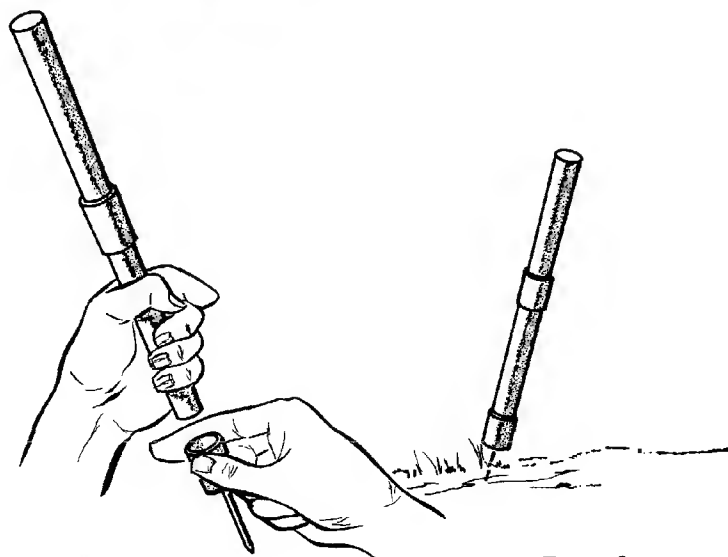
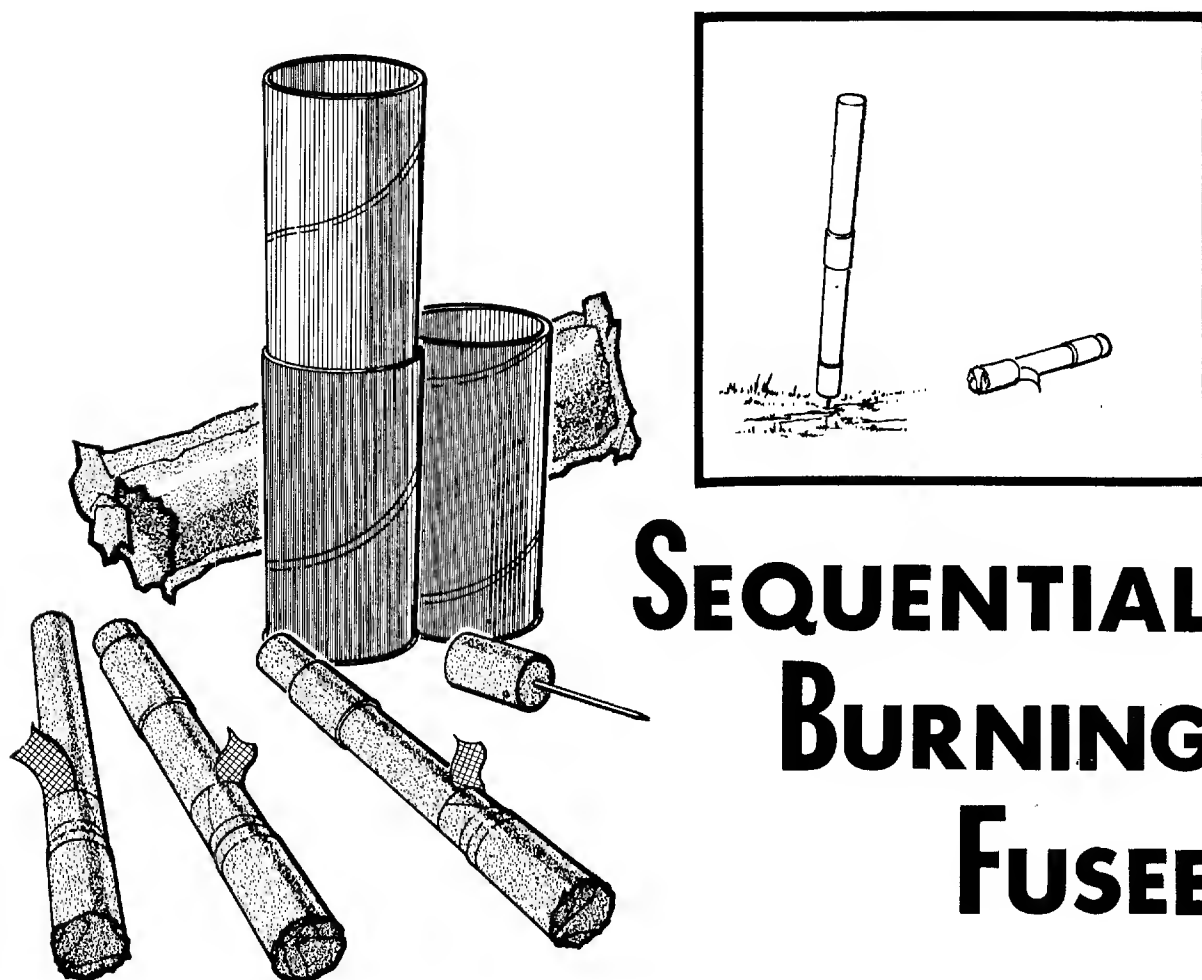


Figure 2

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# SEQUENTIAL BURNING FUSEE

## description

This item consists of three separate, modified, railroad-type flares that may be utilized in a one-, two-, or maximum three-unit sectionalized assembly for DZ authentication. The sequential burning time varies from 10 minutes for one flare through as much as 20 or 30 minutes for multiple-flare usage. Each flare has an igniter on its base which provides for the chain ignition of the next flare if two or three are used. The flares are available in unit packs of three in the following colors: RED, GREEN, or YELLOW.

The flares may be easily and rapidly assembled end to end. Multiple-flare assembly is done simply by pulling the cloth tab of the first flare upwards to remove the protective cap and inserting this exposed top into the adjustable plastic sleeve at the base of another flare. The resultant assembly, in turn, is inserted into a special base mount provided for this purpose. The base mount must be

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Excluded from automatic  
downgrading and declassification

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stuck into the ground at a slight angle to assure complete burning and to prevent a chimneying effect.

The complete unit, including flares, sleeves, and base mount, is first sealed within barrier material of heavy, foil-lined paper and then placed in a cylindrical cardboard tube having metal ends. All items discussed above are sterile regarding marks of identification.

## **specifications**

Modified standard railroad flares (red, green, or yellow)

- 1 flare -- length, 8-1/2 inches; burning time, 10 minutes
- 2 flares -- assembled length, 17 inches; burning time, 20 minutes
- 3 flares -- assembled length, 25-1/2 inches; burning time, 30 minutes
- 2 plastic sleeves
- 1 plastic mounting base

## **procurement**

1370-H00-7950 (Color Designation)

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downgrading and declassification



EQUIPMENT SUITABILITY GROUP

Test Report

on

Sequential Flares

*Tech File*  
→

*[Signature]*

17 March 1964

MEMORANDUM FOR: DC/TSD

SUBJECT : Sequential Flares - ESG Project 63-514

1. Attached is the Final Test Report on the Sequential Flares submitted for test by TSD/EB. All tests were conducted [REDACTED] with the exception of night [REDACTED]. The Memorandum, dated 11 December 1963, which gives the results of the [REDACTED] tests is included with the Final Report. Testing was conducted and/or monitored by the [REDACTED] Section of ESG.

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2. Based on the results of these tests, it is recommended that the green flare as presently manufactured not be considered for Agency use. The red and yellow flares proved very satisfactory during tests. The packaging in the foil-lined, asphalt tube is barely adequate for moisture vapor protection. It is suggested that the requirement be re-evaluated to determine if a metal tear strip can would not be allowable. If the asphalt tube is necessary the inner foil heat seal package should be cloth scrim backed instead of paperbacked. Results show that the flares should not be issued unpackaged.

3. The blue flares employed in the [REDACTED] observation tests were early prototypes not in sequential form. These blue flares appeared very promising and it was understood that the Blue Sequential Flares would be submitted for test. No such flares have yet arrived.

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Attachment:  
ESG Tests (Memo For The  
[REDACTED] Record, dated 11 Dec. 1963)  
[REDACTED] Test Report

[REDACTED]  
C/TSD/ESG

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11 December 1963

MEMORANDUM FOR THE RECORD

SUBJECT: Sequential Flares - ESG Project 63-514

1. On 5 December 1963, [REDACTED]

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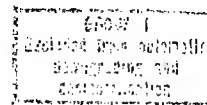
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[REDACTED] and the undersigned conducted some observation tests from a helicopter at night on the red, green, yellow and blue flares. Altitudes were two and three thousand feet. Due to the angle of observation, the line-of-sight distance was three-fifths and four-fifths miles. A higher altitude was not obtainable due to the local air traffic at the time. These tests were required to determine if colors were distinguishable at various heights when little or no ground haze existed.

2. Flares of all four colors were placed and ignited singly in a dark, open field near the Airport. After observing them singly, a pattern using one of each color was made with each flare spaced about forty yards apart in a square. Listed below is a brief summary of comments on each colored flare. Most observers present were in general agreement with these statements.

A. Red Flares - When used singly and in a pattern with other colors, the red was easily identified at 3,000 ft. There is no doubt that a much greater distance can be obtained with the red.

B. Yellow Flares - A very slight orange effect occurred at two and three thousand feet when they were burned singly and in a pattern with other colors. In previous tests, ground to ground observations showed the yellow to appear almost white at about 300 yards. This was not the case when observed from the air; they were very easily identified as yellow even though this slight orange effect took place. A much greater distance with this flare should also be obtainable.



- 2 -

C. Blue Flares - They were easily identified when burned separately from other colors when observed at 3,000 feet. Blue when in a pattern with green was very very hard to tell them apart. At least with the present green flare, a blue should not be used in a pattern. They appeared to be almost the same even at 2,000 feet.

D. Green Flares - These were not easily identified at 2,000 or 3,000 feet, either singly or in a pattern with other colors. The green appeared almost white when burned singly. In a pattern with other colors, it could not easily be distinguished from the blue.

3. Based on the results of these tests, it is recommended that green, as it is now manufactured, not be favorably considered for our use. There is no doubt that a more suitable green can be developed if required. Overall results of tests were much better than expected since ground to ground observations made in the past indicated possible poor results in the colors green and yellow. The final report on tests conducted at a Contractor is presently being written and should be completed in December, 1963. This report will cover only the red, green and yellow. A proposal for conducting the same tests on the blue flare has been requested.

TSD/ESG

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Distribution:

Orig. - ESG (63-514)

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1 - TSD/EB

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1 - TSD/CAB/SD

1 - ESG Lab.

1 - chrono

TSD/ESG/CEW:ck (11 Dec. 1963)

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**Approved For Release 2001/03/03 : CIA-RDP78-06311A000100150008-7**

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